How can we stimulate and exploit a market in Africa for small wind turbines

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How can we stimulate and exploit a market in Africa for small wind turbines

Wind Energy Denmark,
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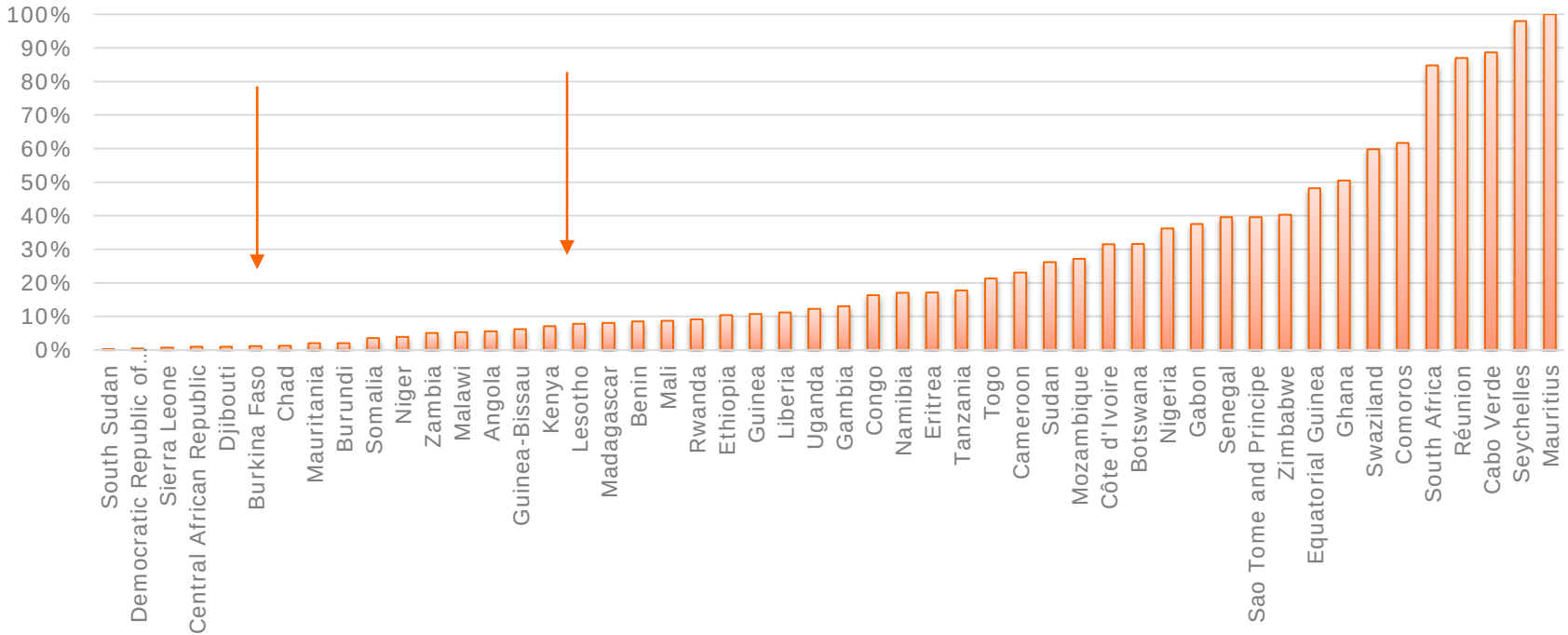
Outline

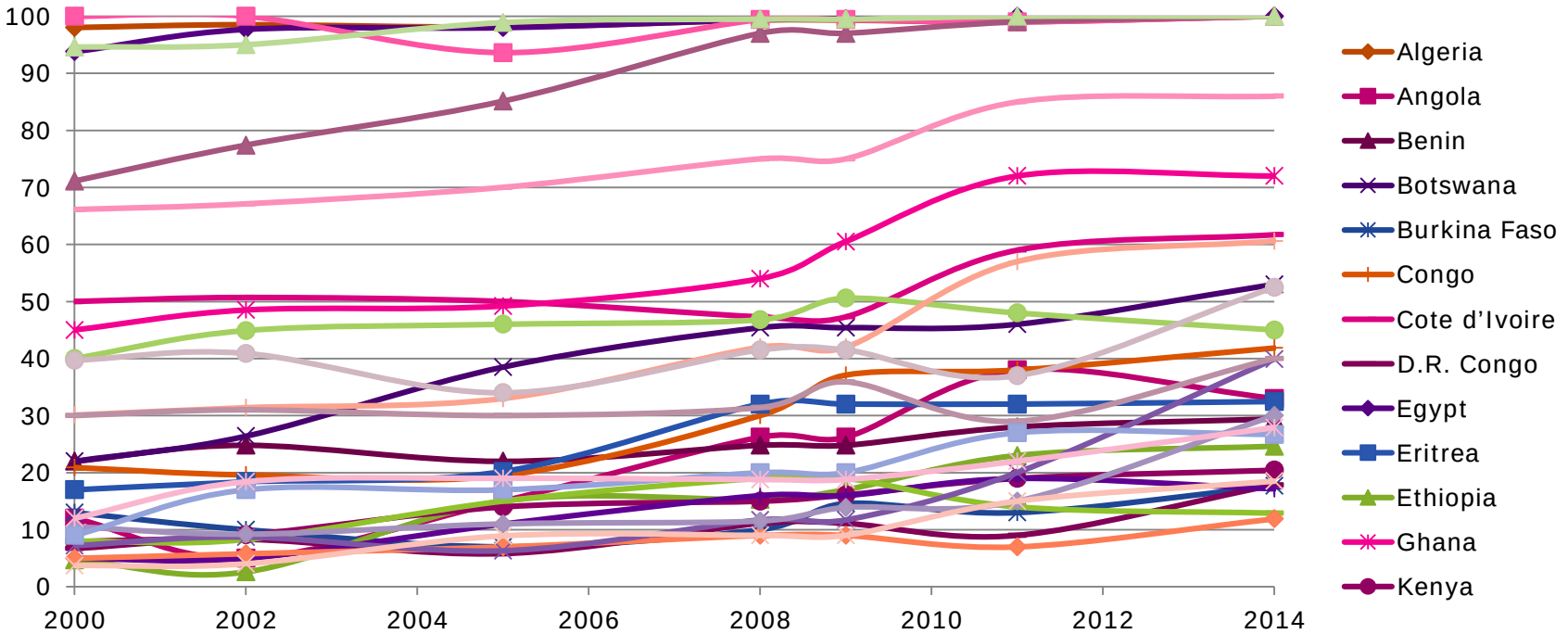
- Rural electrification in Sub Saharan Africa (SSA)
- Recent game changers
- New dynamic players
- Danida support to create new market opportunities for small wind turbines in Kenya

Rural electrification rates in SSA in 2014



Source: World Energy Outlook, IEA, 2016

Development of overall electrification rates in SSA

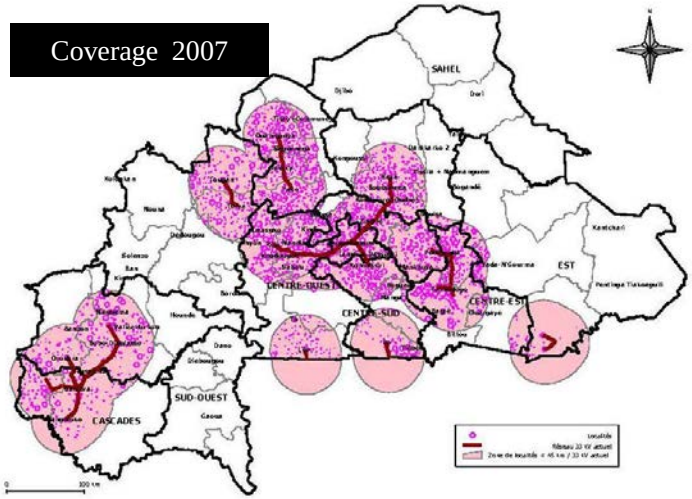


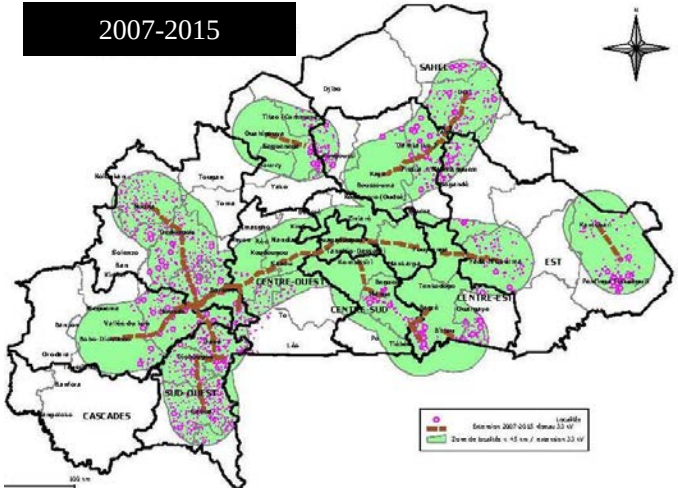
Source: World Energy Outlook, IEA, various years

Spatial delimitation, markets and technologies

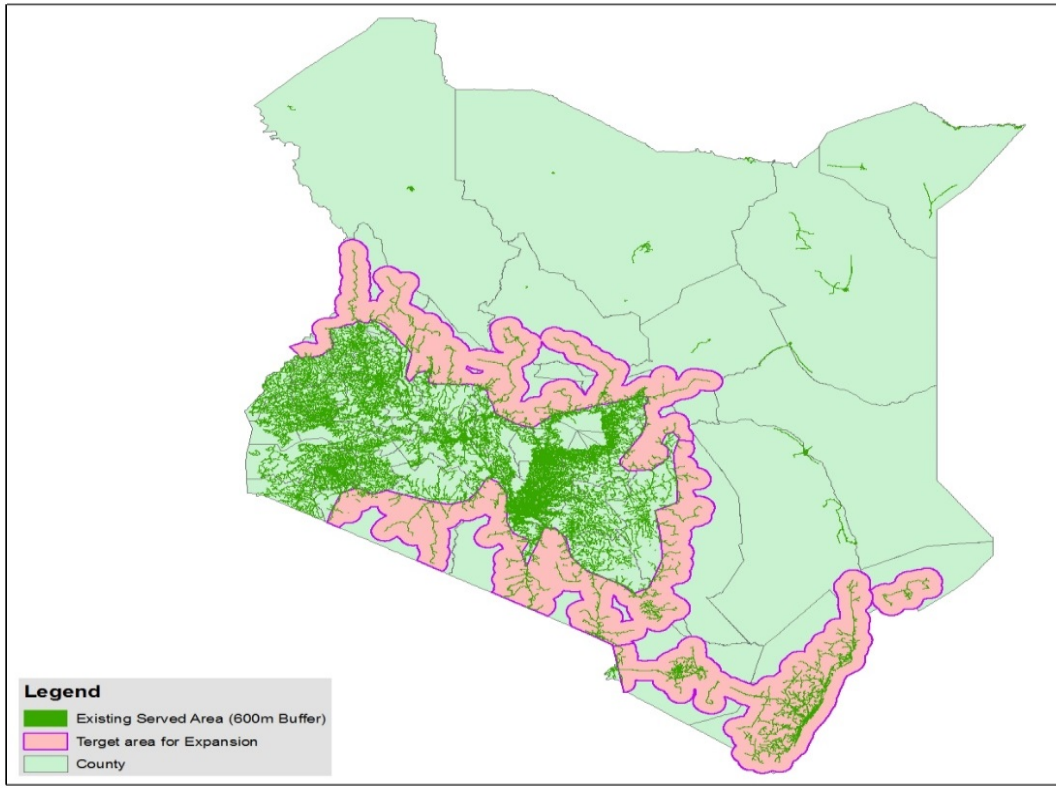
- Criteria
  - Distance, Demand, Density
- Grid
  - Hydro, Wind, Solar, Biomass, Geothermal
- Mini-grid
  - Hybrids: Micro-hydro, PV, Wind, Biofuel, Biogas, gasification
- Off – grid
  - Solar PV, Wind pumps

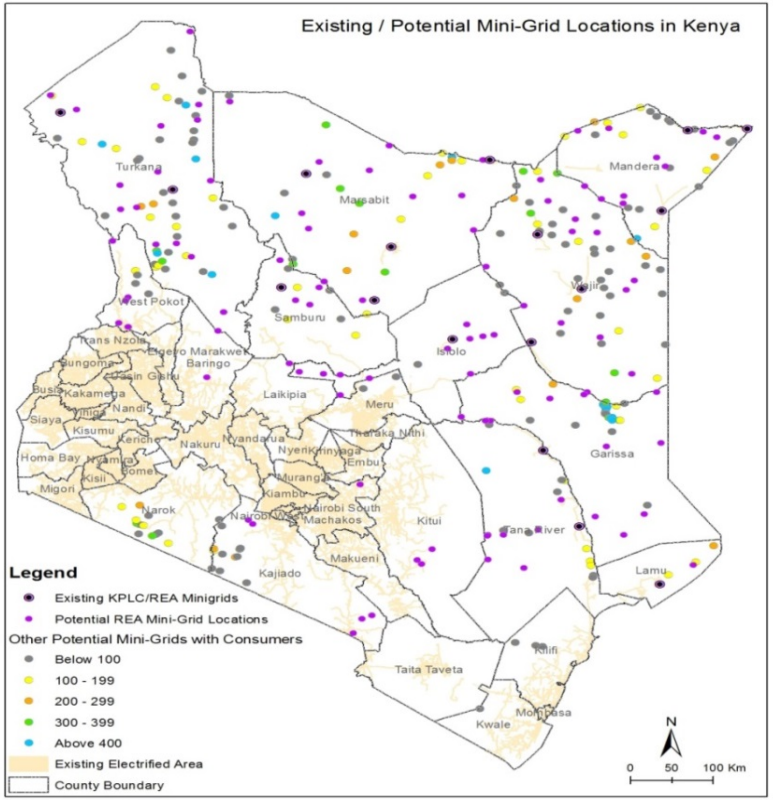
Source: MMCE (2008). Vision 2020 de l'accès au services énergétiques modernes au Burkina Faso. Projet MEPRED 2008 financed by EU, UNDP and DANIDA





Deliminations of grid and off-grid in Kenya





Source: Kenya Electrification Strategy Project: Off-Grid Implementation Strategy, January 2017

Game changers

Policy and finance

- Sustainable Energy for All (SE4ALL) - 2012
  - Universal access to energy
  - Doubling the share of renewable energy
  - Doubling the rate of improvement of energy efficiency
- Sustainable Development Goals - 2015
- Paris Agreement - 2015
- Local policy and planning

Technology and business models

Efficient and cheaper systems

- LED lamps
- Reduced cost of PV
- Improved battery technology

New business models

- Communication technology
- Mobile payment systems
- Pay As You Go (PAYG)

PowerGen

Owns and operates 12 mini-grids with a capacity of 1.4 - 6 kW.
Installed additionally 18 for others in Kenya and Tanzania

Photo: Mathilde Brix Pedersen

Powerhive

- Owns and operates 4 mini-grids in Western Kenya, Kisii area since 2015
- Size, 1.5 kW, 10 kW, 20 kW, 50 kW
- Currently building 20 mini-grids for own funding
- 100 mini-grids in pipeline

Photo: Mathilde Brix Pedersen

Kenya Miniwind

Long term objective

To stimulate economic growth, poverty reduction, and sustainable energy supply in rural areas in Kenya.

The medium term objective

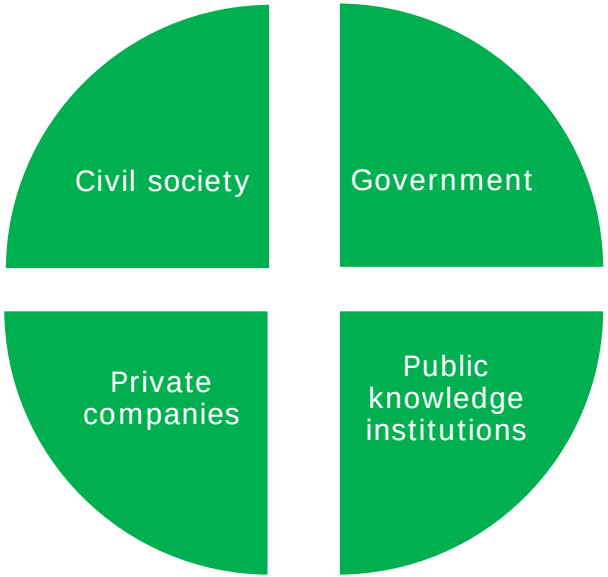
To create **local employment** and **reduce the cost of electricity** which will favour disadvantaged communities in rural areas:

- by facilitating partly **local production** of low-cost wind turbines and
- by demonstrating integration of these turbines in private and publically owned mini-grids in Kenya.

Vestas V 15 55 kW

Public private collaboration

Sustainable Energy



- Rural Electrification Authority

- Ministry of Energy
- Energy Regulatory Commision

- Mini-grid developers
- Wind turbine developer (Vestas)
- Local suppliers

- Kenya Climate Innovation Centre
- Technical University of Denmark
  - Unep DTU
  - DTU Wind
  - DTU Electro

Challenges

Public part of project

a) being able to make quick and accurate decisions on where it makes sense to integrate wind power,

b) demonstrating the value of wind energy in reducing the need for storage, and

c) navigating and influencing the regulatory framework such that the private sector can be effectively mobilised to deliver mini-grids in the numbers that make a good business case.

Vestas

a) getting the price of wind-generated energy down to compete with solar,

b) making a turbine that is reliable, effective and cheap,

PV and control system by Powergen

Photo: Mathilde Brix Pedersen

Project outputs and activities

- Enabling framework and market creation for mini grids with wind power supported by relevant Kenyan authorities
  - Market study, enabling frameworks, need for standards
- Local community requirements reflected in mini-grids with wind power
  - Feasibility studies, community dialogue, model for expansion
- Capacity of mini-grid developers and local companies involved in production of wind turbines enhanced
  - Partly local production, suppliers, decission making tool, training of stakeholders
- Wind turbine designed, demonstrated and tested
  - Vestas design, demonstration, business model, contracting, maintenance, monitoring.

Key messages

- Electrification rate in Sub Saharan Africa is low and has progressed slowly for years
- Africa is currently moving technologically, economically and financially
- Small scale wind energy can be an important market in combination with PV.
- The DMDP project will investigate and demonstrate this opportunity though a public - private partnership project

800 W turbine developed by Powergen


Thanks for your attention